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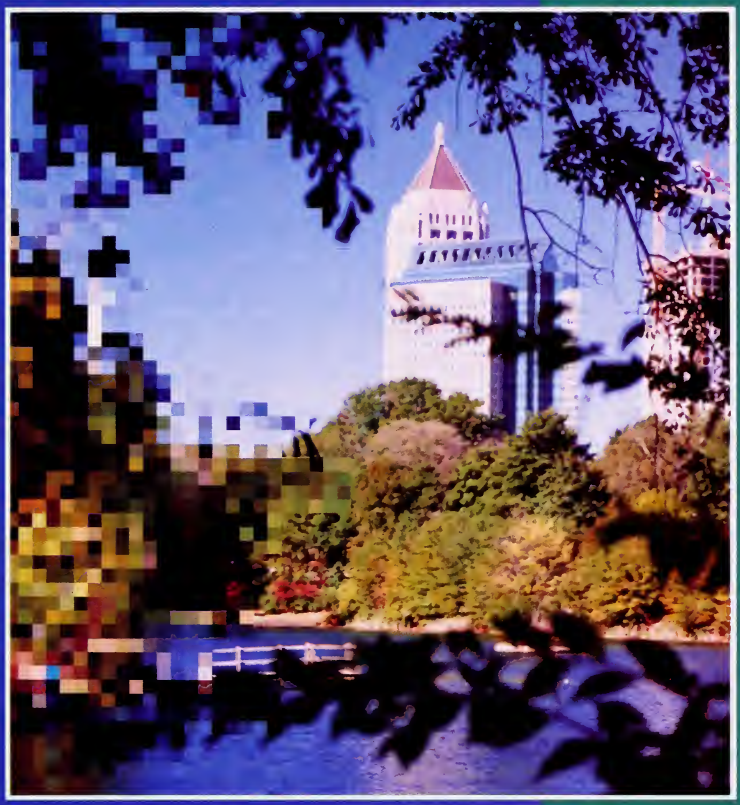
Benefits of Urban Trees



Urban And Community Forestry: Improving Our Quality Of Life

United States Department of Agriculture
Southern Region

Urban and community forestry can make a difference in our lives. Each one of us can make a personal contribution. As we develop and apply technologies for a better way of life, often times side effects adversely affect our natural environment. For example, in our urban areas summer temperatures and noise levels are higher than in the surrounding countryside. Air pollution problems are more concentrated, and the landscape is significantly altered, reducing personal health benefits available to us by having access to wooded areas and green open spaces. Trees help solve these problems. Now, 75 percent of us live in cities and towns and we can act individually to improve our natural environment through the planting and care of trees on our own streets, and by supporting community-wide forestry programs. Through technology we are learning more about trees and how they benefit mankind, and how we can do a better job of planting and caring for these trees that make up our urban forests.

TREES ADD BEAUTY AND IMPROVE PERSONAL HEALTH

Trees

Streets

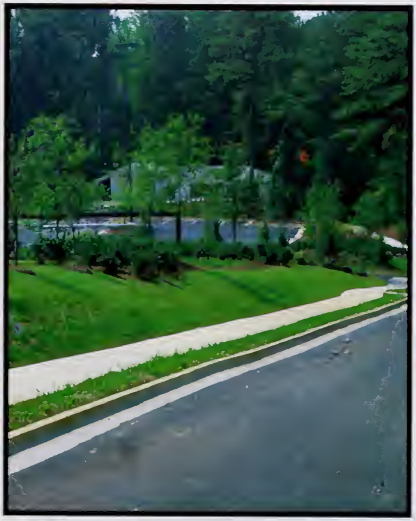
Public buildings

INTRODUCTION

Trees are major capital assets in America's cities and towns. Just as streets, sidewalks, sewers, public buildings and recreational facilities are a part of a community's infrastructure, so are publicly owned trees. Trees—and, collectively, the urban forest—are important assets that require care and maintenance the same as other public property.

Trees are on the job 24 hours every day working for all of us to improve our environment and quality of life.

Recreation facilities



Sidewalks

Sewerage systems

Without trees

With trees

Without trees, the city is a sterile landscape of concrete, brick, steel and asphalt. Picture your town without trees. Would it be a place where you would like to live? Trees make communities livable for people. Trees add beauty and create an environment beneficial to our mental health. Trees:

- Add natural character to our cities and towns.
- Provide us with colors, flowers, and beautiful shapes, forms and textures.
- Screen harsh scenery.
- Soften the outline of masonry, metal and glass.
- Can be used architecturally to provide space definition and landscape continuity.

Trees impact deeply on our moods and emotions, providing psychological benefits impossible to measure. A healthy forest growing in places where people live and work is an essential element of the health of the people themselves. Trees:

- Create feelings of relaxation and well-being.
- Provide privacy and a sense of solitude and security.

- Shorten post-operative hospital stays when patients are placed in rooms with a view of trees and open spaces.

A well-managed urban forest contributes to a sense of community pride and ownership.

TREES REDUCE AIR POLLUTION

Trees and other plants make their own food from carbon dioxide (CO_2) in the atmosphere, water, sunlight and a small amount of soil elements. In the process, they release oxygen (O_2) for us to breathe. Trees:

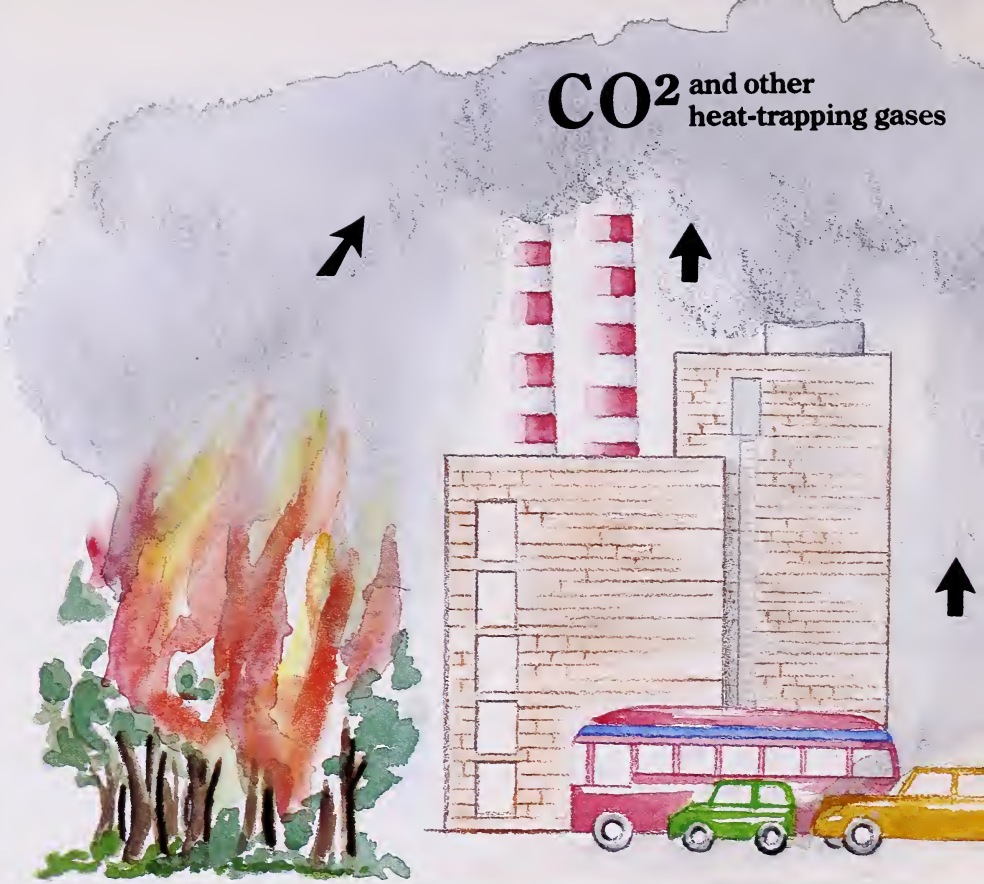
- Help to settle out, trap and hold particulate pollutants (dust, ash, pollen and smoke) that can damage human lungs.
- Absorb CO_2 and other dangerous gases and, in turn, replenish the atmosphere with oxygen.
- Produce enough oxygen on each acre for 18 people every day.
- Absorb enough CO_2 on each acre, over a year's time, to equal the amount you produce when you drive your car 26,000 miles.

Trees remove *gaseous* pollutants by absorbing them through the pores in the leaf surface. *Particulates* are trapped and filtered by leaves, stems and twigs, and washed to the ground by rainfall.

Air pollutants injure trees by damaging their foliage and impairing the process of photosynthesis (food making). They also weaken trees making them more susceptible to other health problems such as insects and diseases.

The loss of trees in our urban areas not only intensifies the urban "heat-island" effect from loss of shade and evaporation, but we lose a principal absorber of carbon dioxide and trapper of other air pollutants as well.

Some of the major air pollutants and their primary sources are:

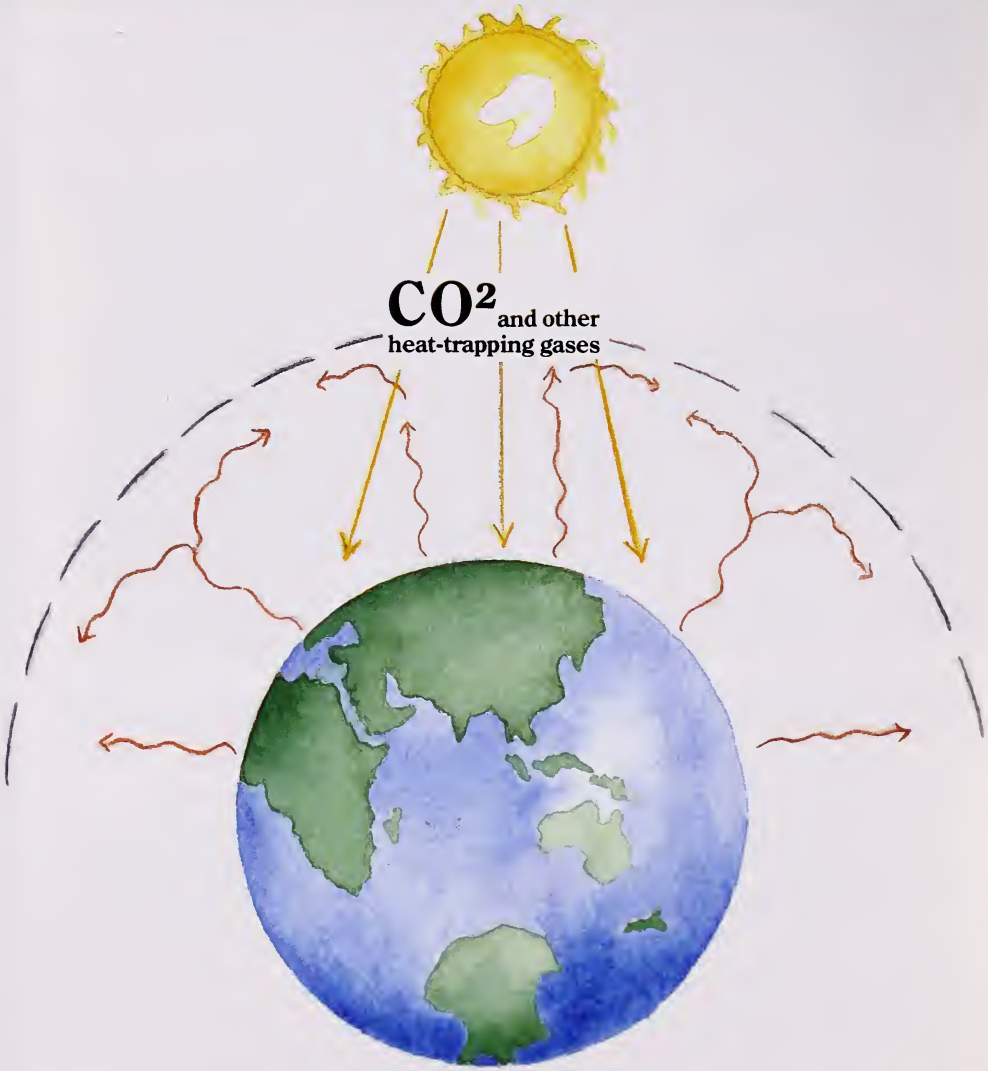


POLLUTANT	MAJOR SOURCES
Carbon dioxide	Burning oil, coal, natural gas for energy. Decay and burning of tropical forests.
Sulfur dioxide	Burning coal to generate electricity.
Hydrogen fluoride and silicon tetrafluoride	Aluminum and phosphate fertilizer production, oil refineries, and steel manufacturing.
Ozone	Chemical reactions of sunlight on automobile exhaust gases. Ozone is a major pollutant in smog.
Methane	Burning fossil fuels, livestock waste, landfills and rice production.
Nitrous oxides	Burning fossil fuels and automobile exhausts.
Chlorofluorocarbons	Air conditioners, refrigerators, industrial foam.

The burning of fossil fuels for energy and large scale forest fires such as in the tropics are major contributors to the buildup of CO^2 in the atmosphere.

Managing and protecting forests and planting new trees reduces CO^2 levels by storing carbon in their roots and trunk and releasing oxygen into the atmosphere.

TREES FIGHT THE ATMOSPHERIC GREENHOUSE EFFECT



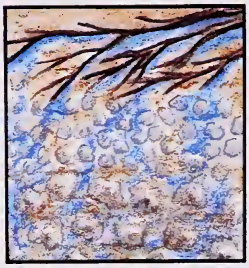
Heat from Earth is trapped in the atmosphere due to high levels of CO^2 and other heat-trapping gases which prohibit it from releasing heat into space—creating a phenomenon known as the "greenhouse effect."

The greenhouse effect is created when heat from the sun enters the atmosphere and is prevented from radiating back into space by air-polluting gases. The buildup of about 40 heat-trapping gases is created mostly by human activities. Heat buildup threatens to raise global temperatures to levels unprecedented in human history. About half of the greenhouse effect is caused by CO_2.

Trees act as a carbon sink by removing the carbon from CO_2 and storing it as cellulose in the trunk while releasing the oxygen back into the air. A healthy tree stores about 13 pounds of carbon annually—or 2.6 tons per acre each year.

Trees also reduce the greenhouse effect by shading our homes and office buildings. This reduces air conditioning needs up to 30 percent, thereby reducing the amount of fossil fuels burned to produce electricity.

This combination of CO_2 removal from the atmosphere, carbon storage in wood, and the cooling effect makes trees a very efficient tool in fighting the greenhouse effect.



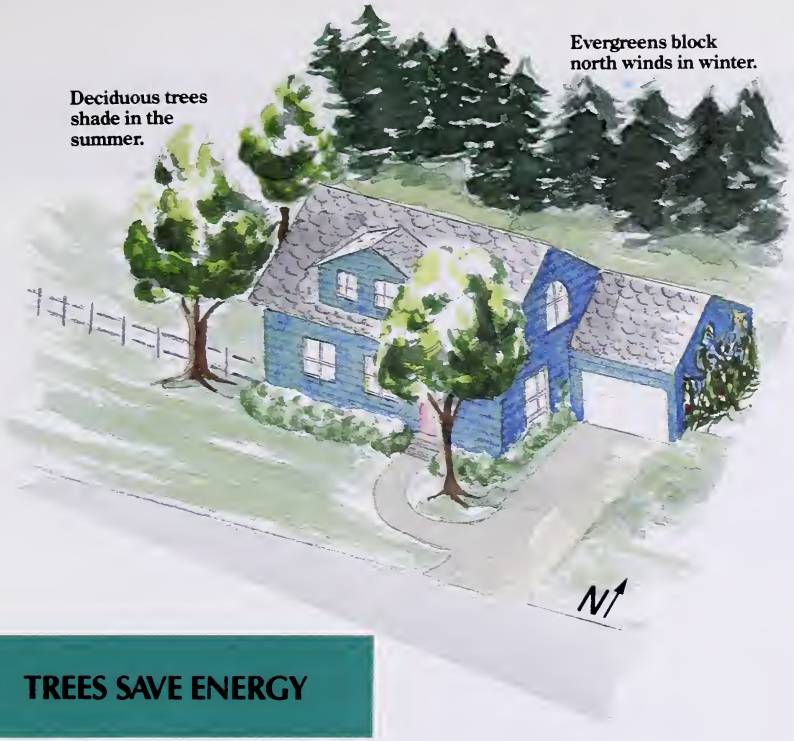
Tree roots hold soil in place and increase water infiltration.

TREES CONSERVE WATER AND REDUCE SOIL EROSION

Trees create organic matter on the soil surface from their leaf litter. Their roots increase soil permeability. This results in:

- Reduced surface runoff of water from storms.
- Reduced soil erosion and sedimentation of streams.
- Increased ground water recharge that is significantly reduced by paving.
- Lesser amounts of chemicals transported to streams.
- Reduced wind erosion of soil.

Without trees, cities would need to increase sewage and storm water drainage channels and waste-treatment capacities to handle increased water runoff.



TREES SAVE ENERGY

Strategically placed trees can be as effective as other energy saving home improvements, such as insulation and the installation of weather-tight windows and doors. Trees can help reduce your heating and cooling costs.

Trees save energy through cooling in the hotter months. They provide a windbreak during winter. This results in burning less fossil fuels to generate electricity for cooling and heating.

Strategically placed *shade trees*—a minimum of three large trees around your home—can reduce air conditioning costs up to 30 percent. Shade trees offer their best benefits when you:

- Plant *deciduous* trees, which shed their leaves during winter. These trees provide shade and block heat from the sun during hotter months. By dropping their leaves in the fall they admit sunlight in the colder months.
- Place these trees on the south and west sides of buildings.
- Shade all hard surfaces such as driveways, patios and sidewalks to minimize landscape heat load.

Use *evergreens*, which retain their leaves/needles yearlong, in a planned pattern. They will serve as *windbreaks* to save from 10 to 50 percent in energy used for heating. Evergreens offer their best benefits when you:

Hotter

More Glare

More Noise

More Water Runoff

More Energy Used

Harsh Landscape

Cooler

Less Glare

Absorbs Noise

Less Runoff

Less Energy

More Beautiful

- Place them to intercept and slow winter winds, usually on the north side of your home.
- Do *not* plant them on the south or west sides of your home, because they block warming sunlight during winter. These trees also provide some shading benefits during summer.

Get professional assistance to assure correct selection of species and their placement to maximize energy savings.

TREES MODIFY LOCAL CLIMATE

Trees can help cool the "heat island" effect in our inner cities. These islands result from storage of thermal energy in concrete, steel and asphalt. Heat islands are 3 to 10 degrees warmer than the surrounding countryside. The collective effect of a large area of transpiring trees (evaporating water) reduces the air temperature in these areas.

Trees also:

- Lower air temperature through shade.
- Increase humidity in dry climates

through evaporation of moisture.

- Reduce glare on sunny days.
- Reduce wind speed.

TREES INCREASE ECONOMIC STABILITY

The scope and condition of a community's trees and, collectively, its urban forest, is usually the first impression a community projects to its visitors. Studies have shown that:

- Trees enhance community economic stability by attracting businesses and tourists.
- People linger and shop longer along tree-lined streets.
- Apartments and offices in wooded areas rent more quickly, have higher occupancy rates and tenants stay longer.
- Businesses leasing office space in wooded developments find their workers are more productive and absenteeism is reduced.

A community's urban forest is an extension of its pride and community spirit.

"Never doubt
that a small group
of thoughtful, committed
citizens
can change the world.
Indeed,
it's the only thing
that ever has."

– Margaret Mead

FOR ADDITIONAL INFORMATION
Contact the office listed below:

Sources of Assistance

USDA Forest Service
1720 Peachtree Road, NW
Atlanta, GA 30367-9102

Your State Forestry Agency

Your Cooperative Extension Service

USDA Forest Service – Southern Region
Southern Group of State Foresters
Cooperative Extension Service

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